



# PATENT SPECIFICATION

NO DRAWINGS

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## COMPLETE SPECIFICATION

### Production of Sodium Acrylate

We, THE DISTILLERS COMPANY LIMITED, of 12 Torphichen Street, Edinburgh 3, Scotland, a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a process for the production of sodium acrylate.

It has been proposed to produce sodium acrylate by mixing together aqueous solutions of sodium hydroxide and acrylic acid in approximately stoichiometric amounts. Because of the relatively high solubility of sodium acrylate in water, the resultant aqueous solution must be evaporated to recover solid sodium acrylate. It is necessary to evaporate under reduced pressure because of the tendency of sodium acrylate to polymerise at elevated temperature. Even under the most favourable conditions the sodium acrylate produced contained considerable amounts of polymer. Furthermore, evaporation of water from the aqueous solution is costly in terms of energy requirements.

It is an object of the present invention to produce sodium acrylate by a route in which the disadvantages mentioned above are mitigated or obviated.

According to the present invention there is provided a process for the production of sodium acrylate in which a solution of sodium hydroxide in methanol and a solution of acrylic acid in methanol are mixed together, whereby a precipitate of sodium acrylate is produced, and the precipitate is subsequently separated from the methanol solution.

The strength of the solutions of sodium hydroxide and acrylic acid can vary to some considerable extent, but suitable strengths are 25% w/w and 50% w/w respectively. The relative proportions of sodium hydroxide and acrylic acid are preferably stoichiometric. In order to minimise polymerisation, the solution of sodium hydroxide in methanol is most suit-

ably added to the solution of acrylic acid in methanol within the temperature range 5° to 50°C. The solutions can be mixed batchwise or continuously, for example by means of a mixing tee.

The precipitated sodium acrylate can be separated from its mother liquor, for example by centrifugation or filtration. The mother liquid from which the sodium acrylate is separated can be recycled to become the solvent for a fresh quantity of acrylic acid. If the mother liquor is recycled it should not be used as a solvent for the sodium hydroxide, since strong sodium hydroxide has a deleterious effect on the residue of sodium acrylate present in the mother liquor.

The separated sodium acrylate can be dried, preferably at a temperature below 40°C.

The following examples illustrate the invention:

#### Examples 1—8

A solution of sodium hydroxide of the strength and amount shown in the table was slowly added to a solution of acrylic acid in methanol of the strength and amount shown in the table. The acrylic acid solution was contained in a stainless steel bucket, stirred during the addition of sodium hydroxide, and maintained at a temperature within the range 5—30°C by means of a cold water bath. The resultant precipitate was filtered off and dried in an oven below 40°C.

The mother liquor from which the precipitate was separated in Example 1 was used to dissolve the acrylic acid in Example 2. The mother liquor from Examples 2—8 was evaporated to yield a further 954 gm of solid which was analysed as 93.6% sodium acrylate and 3.7% sodium polyacrylate.

The dried precipitates from Examples 1 and 3—8 were intimately mixed. 1 gram of the mixed precipitates gave a clear solution in 10 ml of 50% isopropanol. In a 6 in. Lovibond cell, this solution had colour of 0.6Y, 0.4R and 0.3B.

[Price 4s. 6d.]

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Example	1	2	3	4	5	6	7	8
Acrylic acid (gm)	1080	1080	1080	1080	1095	1080	1080	2160
Fresh methanol (gm)	1110		1110	1110				1813
Recycle mother liquor methanol (gm)		1110						
Recovered methanol (gm)					1100	1100	1100	
Sodium hydroxide (gm)	600	600	600	600	605	600	600	1200
Methanol (gm)	1920	1920	1920	1920	1950	1900	1900	3840
Time taken to complete addition (hrs.)	1.0	2.5	3.0	3.0	0.8	1.0	1.1	2.7
Temperature	30 max	30	25	25	12— 24.5	30 max	12— 25	5.5— 20.5
Dry weight of precipitate (gm)	1140	1205	1135	1162	1137	1168	1137	2297
<i>Analysis of precipitate (% w/w)</i>								
Sodium acrylate	98.6	99.0	99.1	98.3	99.2	99.4	98.5	99.2
Sodium polyacrylate	0.7	0.2	0.5	1.7	0.4	0.7	0.3	0.2
Water	—	—	—	—	—	—	—	0.03
Acidity (acrylic)	trace	neutral	trace	trace	neutral	neutral	trace	neutral

#### WHAT WE CLAIM IS:—

1. A process for the production of sodium acrylate in which a solution of sodium hydroxide in methanol and a solution of acrylic acid in methanol are mixed together, whereby a precipitate of sodium acrylate is produced, and the precipitate is subsequently separated from the methanol solution.
2. The process according to claim 1 wherein the concentration of the sodium hydroxide solution is 25% w/w.
3. The process according to Claim 1 or 2 wherein the concentration of the acrylic acid solution is 50% w/w.
4. The process according to any of the preceding claims wherein the sodium hydroxide and acrylic acid are reacted in stoichiometric proportions.
5. The process according to any of the preceding claims wherein the solution of sodium hydroxide is added to the solution of acrylic acid at a temperature in the range from 5° to 50°C.
6. The process according to any of the pre-

ceding claims wherein the sodium acrylate is separated from the mother liquor by centrifuging.

7. The process according to any of the preceding claims wherein the sodium acrylate is separated from the mother liquor by filtration.

8. The process according to any of the preceding claims wherein the mother liquor from which the sodium acrylate is recovered is recycled as solvent for acrylic acid in the reaction.

9. The process according to any of the preceding claims wherein the sodium acrylate is dried at a temperature below 40°C.

10. A process for the production of sodium acrylate with particular reference to the examples herein.

11. Sodium acrylate whenever produced by the process of any of the preceding claims.

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